



103-006-CIP

TITLE

5 **Methods of Synthesis of Polysuccinimide, Copolymers of Polysuccinimide
and Derivatives thereof**

10 This application is a Continuation-In-Part of Applications Ser. No. 10/307,349
and 10/307,387, both filed December 2, 2002, which are a Continuation and
Continuation-In-Part, respectively, of Application Ser. No. 09/776,897, filed
February 6, 2001, now US Patent No. 6,495,658, issued December 17, 2002, all
three of which are incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION

Field of the Invention

15 The present invention relates to a process for the preparation of
polysuccinimide, and derivatives; the polysuccinimide is formed in a supercritical
fluid (SCF), such as liquid CO₂ or supercritical CO₂ in an organic cosolvent,
starting with L-aspartic acid, and the derivatives are formed by a ring-opening
reaction.

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Discussion of the Related Art

25 L-Aspartic acid has been produced commercially since the 1980's via
immobilized enzyme methods. The aspartic acid so produced mainly has been
used as a component of the synthetic sweetener, N-aspartyl phenylalanine methyl
ester (ASPARTAME®).

30 In a typical production pathway, a solution of ammonium maleate is
converted to fumarate via action of an immobilized enzyme, maleate isomerase,
by continuous flow over an immobilized enzyme bed. Next, the solution of
ammonium fumarate is treated with ammonia also by continuous flow of the
solution over a bed of the immobilized enzyme, aspartase. A relatively